ACRL Plan: A Postclosure Care Reduction and/or Termination Plan Using the Allen County Regional Landfill as a Prototype Landfill (7-1-15)

Preface

Subtitle D landfills have the option to reduce and/or terminate postclosure care (PCC) activities of closed units or an entire landfill as outlined in BWM Policy 2014-P2 (June 27, 2014) (1). The way to do this is to prepare a PCC Reduction and/or Termination Plan as outlined in the BWM Technical Guidance Document SW-2014-G1 (2). The primary incentive for doing this is the possibility of financial assurance cost savings related to reduced and/or terminated PCC activities.

Objective

The purpose of this document is to present a Postclosure Care Reduction and/or Termination Plan for the Allen County Regional Landfill (ACRL) so that specific landfill activities can be reduced or terminated with a concurrent cost savings.

Document Development Strategy

ACRL's existing Closure and Postclosure Plans (3, 4) were hypothetically revised to prepare a present day PCC Reduction and/or Termination Report (5). The prototype report was generated from available information along with an assumed modifications document (6).

The preceding documents (5, 6) were prepared before this proposed plan because the BWM wanted to provide Subtitle D stakeholders with a sample report which could result from a situation where there was no plan as per TGD SW-2014-G1. This is the most common case for Kansas Subtitle D landfills. Also, this report will provide insight into what is important in preparing a revised plan.

ACRL Postclosure Care Reduction and/or Termination Plan (designated **ACRL Plan)**

The **ACRL Plan** represents an idealized approach to provide the data needed to obtain BWM approval of an eventual ACRL PCC Reduction and/or Termination Report which would most likely receive the best possible BWM evaluation and approval. The **ACRL Plan** format will follow the Plan Content's section (which includes extracts from subsequent sections) given in SW-2014-G1 (2). Reference 5 is the **ACRL Report** based on the exiting conditions which do not reflect the ideal **ACRL Plan** conditions.

Plan Contents

SW-2014-G1 (2) indicates that the **ACLF Plan** will include the following considerations (listed as **bullets** with pertinent extracts from the TGD). Note that **bold type** is used for emphasis and for specifics of the proposed **ACRL Plan**.

• **The criteria that will be used to determine when a particular post-closure care activity can be reduced or terminated** - The Trend Analysis section (2) lists these criteria: "The proposed

trend methodology to determine when one or more PCC activities may be reduced and/or terminated will involve a minimum of 3 major evaluation periods of at least 5 years each where each period is statistically verifiable. The determination of equilibrium for leachate and landfill gas emissions can be accomplished by quarterly sampling over a 5-year demonstration period, during which there is no statistically significant difference in key parameter values with time. If there is a statistically significant difference in any of the key parameters, a new 5-year demonstration period must begin. After 1 demonstration period in which key parameters are shown to be in equilibrium, reduction of appropriate activities may begin, after approval by KDHE. After 3 consecutive demonstration periods in which key parameters are shown to be in equilibrium, appropriate activities may be terminated, after approval by KDHE."

• **Key monitoring parameters that will be used to determine the degree of equilibrium and/or the stability of the waste** - The key parameters are for the monitoring of leachate and LFG emissions; also, groundwater monitoring. Monitoring requirements are listed according to the following extracts from SW-2014-G1 (2) and recommended sampling frequencies:

Leachate Monitoring - The **ACRL Plan** defines the leveling out of leachate composition and quantity/flow rate (which together define the mass flow rate of a contaminant) that can signal the reduction and/or termination of PCC activities. Key leachate parameters for demonstrating the degree of MSW equilibrium and/or stability include: quantity, temperature, five-day biochemical oxygen demand (BOD_5), chemical oxygen demand (COD), ammonia (NH_3), pH and total suspended solids (TSS). **At the least, leachate sampling will be done quarterly for each unit that is closed. This includes Phases I and II, Cell 1A and subsequent cells as they close. Preclosure sampling will be annually, at a minimum, as per KAR 28-29-104(i)(6).**

Landfill Gas Collection and Control System (GCCS) Monitoring – The Owner/Operator of any landfill that has a GCCS will use data collected from the system to demonstrate the degree of MSW equilibrium and/or stability. The **ACRL Plan** will allow the definition of the leveling out of LFG composition and flow rates which can signal the reduction and/or termination of PCC activities, either on their own or in combination with an evaluation of leachate emissions. Key LFG parameters for demonstrating the degree of MSW equilibrium and/or stability include: flow rate, methane (CH_4), non-methane organic compounds (NMOC), carbon dioxide (CO_2) and oxygen (O_2)**.**

Ideally, the LFG sampling frequency should match the leachate sampling effort since both leachate and landfill gas are typically the result of the same reactions within the MSW mass. The coordination of the two sampling efforts will allow comparison of the sampling results and provide a better confirmation of the trend analysis. Samples that accurately represent the individual disposal unit are the best indicator of MSWLF unit equilibrium and/or stabilization.

Groundwater Monitoring – See KAR 28-29-111 through 28-29-113.

• **Supplemental monitoring parameters that will be used to interpret and validate trends in**

the key parameters are described in the following section – The following listing taken from the TGD is used to identify needed supplemental data. Unit information is preferred if available since financial assurance costs savings can be greater than if the data represent the entire landfill. Also, much of this information can be collected routinely at the weight station, by active face operators and/or others designated to collect the data. The required recording frequencies and other added notes are given in **bold type**.

1) LANDFILL INPUTS, including:
    a) MSW disposal data, including: **Daily per truck load.**
        i) Quantity (tonnage)
        i) Composition **Distinguish between residential et al sources.**
        iii) Disposal sequence
        iv) Disposal locations
    b) Added moisture data, including, as available:
        i) Quantity **Daily with collection and application methods cited.**
        ii) Composition **Description, not analytical unless considered necessary.**
        iii) Temperature **Designate if other than ambient temperature.**

    Examples of added moisture sources include: active area precipitation and storm water run-on; infiltration through intermediate and final cover; research, development, and demonstration (RD&D) liquids; and recirculated leachate and/or storm water.
2) LANDFILL OUTPUTS including:
    a) Toe drain, cleanout, and landfill gas (LFG) condensate data including: **As collected.**
        i) Quantity **Estimated amounts at sources.**
        ii) Composition **By source.**
        iii) Temperature **Designate if other than ambient temperature**.
    b) Leachate seep and fugitive LFG emission data including: **As observed for seeps and as per KAR 28-29-108(e) for fugitive LFG emissions.**
        i) Flow rate estimates
        ii) Composition
        iii) Locations
3) STATE OF THE WASTE, including: **Quarterly.**
    a) Spatial temperatures of the stored MSW **Using LFG well temperatures.**
    b) Topographic changes in the surface of the landfill
4) CLIMATIC DATA including: **Daily using an on-site weather station with recorders.**
    a) Wind velocity
    b) Temperature
    c) Atmospheric pressure

- **Sampling points and sampling frequencies – Leachate samples will be taken for Phases I and II at the discharge into the wet well; Cells 1A and 1B at the discharge into SEB No. 1 and subsequent cells at the discharge points into the respective SEBs; LFG samples at well heads, fugitive samples at designated boundary locations, weight house and maintenance building; groundwater samples at designated locations. Leachate sampling guidelines are given in SW-2013-G3 (7) and Leachate Sampling Check Lists (8) for leachate samples; and**

SW-2013-G2 (9) for LFG samples. Also, see Training Primer for Sampling of MSWLF Emissions as part of a Post Closure Care (PCC) Reduction and/or Termination Plan (10).

- **Equipment that will be used to collect the samples – See Reference 10 in the previous bullet.**

- **Methods that will be used to analyze the data and provide quality assurance and quality control - See the QA/QC Procedures sections cited in the Sampling points and sampling frequencies bullet for References 7 and 9; also, the procedures given in Reference 10.**

- **Statistical methods that will be used to evaluate the data – See Postclosure Care (PCC) Statistics for Leachate Trend Analysis: Kendall's Tau (11). The same methodology will be used for LFG emission statistical evaluations.**

Reporting

Throughout the PCC period, the owner/operator will provide an annual report to BWM that summarizes and interprets the data that has been collected and analyzed in accordance with the approved PCC plan. Any deviation from the approved PCC plan must also be reported. In some cases, modification of the PCC plan may be required.

Summary

A comprehensive scientific sampling and analysis plan is proposed for the ACRL that will be used to validate postclosure care reduction and/or terminations recommendations which can result in significant reduction in financial assurance savings. Additional related BWM information is given at the following website: http://www.kdheks.gov/waste/index.html

References

1. **Reduction and/or Termination of Postclosure Care Activities**, BWM Policy 2014-P2 (5-2-14). See: http://www.kdheks.gov/waste/policies/BWM_2014-P2.pdf
2. **Preparation of Postclosure Care Reduction and/or Terminations Plans**, BWM Technical Guidance Document SW-2014-G1 **(**5-2-14). See: http://www.kdheks.gov/waste/techguide/SW-2014-G1.pdf
3. **Operating Plan for Allen County, Kansas, Municipal Solid Waste Landfill and Waste Tire and Industrial Rubber Landfill, KDHE Solid Waste Permit #101**, by Burns & McDonnell Engineering Co., Inc., Project No. 50801 (Revised August 2011).
4. **Permit Modification Horizontal & Vertical Expansion, Allen County Sanitary Landfill, Allen County, Kansas 37214**, by Burns & McDonnell Engineering Co., Inc. (August 2008).
5. **Proposed Allen County Regional Landfill Postclosure Care Reduction and/or Termination Report** (6-4-15)
6. **Proposed Modifications for ACRL Facility Operating Plan** (3-4-15).

7. **Leachate Sampling for Reduction and Termination of Postclosure Care**, BWM Technical Guidance Document, SW-2013-G3 (5-2-2014). See: http://www.kdheks.gov/waste/techguide/SW-2013-G3.pdf
8. **Leachate Sampling Check Lists** (11-6-14). See: http://www.kdheks.gov/waste/p_pcc.html#pccpresentations2014
9. **Landfill Gas Sampling for Reduction and/or Termination of Postclosure Care**, Technical Guidance Document SW-2014-G2 (5-2-2014). See: http://www.kdheks.gov/waste/techguide/SW-2014-G2.pdf
10. **Training Primer for Sampling of MSWLF Emissions as part of a Post Closure Care (PCC) Reduction and/or Termination Plan** (4-23-14). See: http://www.kdheks.gov/waste/forms/pcc/pccsamplingmswlfemissions.pdf
11. **PCC Statistics for Leachate Trend Analysis: Kendall's Tau**, by Carl E. Burkhead (11-5-14). Also, see BWM Presentations Website: SWANA/KDHE Solid Waste Management Conference and Operator Training Course, Manhattan (November 19-20, 2014) http://www.kdheks.gov/waste/p_workshops.html